

10/604,748 NPC STIC Search 8/3/2005 Databases; Search History; & Results

| Set | Items | Description |
|-----|----------|---|
| S1 | 1917762 | MRI OR MAGNETIC(1W) (IMAG? OR IMAGING) OR MAGNETIC(W) RESONA- N? OR NMR OR NUCLEAR() MAGNETIC() RESONANCE OR FTNMR OR FTMRI - OR MAGNETORESONANCE OR PMR OR PROTON(W) MAGNETIC(W) RESONAN? OR MR() (IMAGE? OR IMAGING) |
| S2 | 7378 | MC=(S01-E02A2 OR S03-E07A OR S01-E02A8A OR S01-E02A1 OR S0- 3-E07C OR S05-D02B1 OR S03-C02F1) |
| S3 | 48946 | IC=(G01R-003 OR G01N-024/08 OR G01V-003/A75 OR G01R-033/56F OR G01V-003/00) |
| S4 | 21865 | CC=(A0758 OR A8760I OR B7510N) |
| S5 | 1954405 | S1:S4 |
| S6 | 2869 | GRADIENT() (COIL? OR WIRE?) |
| S7 | 2096434 | COOL????? |
| S8 | 8000675 | FLUID? OR LIQUID? |
| S9 | 4269331 | DIRECT OR IMMEDIAT? OR INSTANT? OR NON() INTERVEAN OR NON(-) INTERVENE? |
| S10 | 41 | S6(6N)S7 |
| S11 | 36 | S5 AND S10 |
| S12 | 32 | RD (unique items) |
| S13 | 7 | S12 AND S8 |
| S14 | 10684813 | DIRECT? OR IMMEDIAT? OR INSTANT? OR NON() INTERVEAN OR NON- () INTERVENE? |
| S15 | 3 | S6 AND S7 AND S9 |
| S16 | 3 | S15 NOT S13 |
| S17 | 272193 | S14 AND S7 |
| S18 | 69195 | S14(10N)S7 |
| S19 | 12 | S14(6N)S7 AND S6 |
| S20 | 9 | RD (unique items) |
| S21 | 6 | S20 NOT (S16 OR S13) |

? show files

File 2:INSPEC 1969-2005/Jul W4
(c) 2005 Institution of Electrical Engineers

File 155:MEDLINE(R) 1951-2005/Jul W5
(c) format only 2005 Dialog

File 5:Biosis Previews(R) 1969-2005/Jul W4
(c) 2005 BIOSIS

File 6:NTIS 1964-2005/Jul W4
(c) 2005 NTIS, Intl Cpyrght All Rights Res

File 8:Ei Compendex(R) 1970-2005/Jul W4
(c) 2005 Elsevier Eng. Info. Inc.

File 73:EMBASE 1974-2005/Aug 03
(c) 2005 Elsevier Science B.V.

File 94:JICST-Eplus 1985-2005/Jun W2
(c) 2005 Japan Science and Tech Corp(JST)

File 35:Dissertation Abs Online 1861-2005/Jul
(c) 2005 ProQuest Info&Learning

File 144:Pascal 1973-2005/Jul W4
(c) 2005 INIST/CNRS

File 105:AESIS 1851-2001/Jul
(c) 2001 Australian Mineral Foundation Inc

File 99:Wilson Appl. Sci & Tech Abs 1983-2005/Jul
(c) 2005 The HW Wilson Co.

File 58:GeoArchive 1974-2005/May
(c) 2005 Geosystems

File 34:SciSearch(R) Cited Ref Sci 1990-2005/Jul W4
(c) 2005 Inst for Sci Info

File 434:SciSearch(R) Cited Ref Sci 1974-1989/Dec
(c) 1998 Inst for Sci Info

File 292:GEOBASE(TM) 1980-2005/Jun B1
(c) 2005 Elsevier Science Ltd.

File 89:GeoRef 1785-2005/Jul B1
(c) 2005 American Geological Institute
File 65:Inside Conferences 1993-2005/Jul W5
(c) 2005 BLDSC all rts. reserv.
File 360:Specialty Chemicals Update Program 2000/Q2
(c) 2000 SRI International
File 239:Mathsci 1940-2005/Sep
(c) 2005 American Mathematical Society
File 347:JAPIO Nov 1976-2005/Apr(Updated 050801)
(c) 2005 JPO & JAPIO
File 305:Analytical Abstracts 1980-2005/Jul W4
(c) 2005 Royal Soc Chemistry
File 350:Derwent WPIX 1963-2005/UD,UM &UP=200549
(c) 2005 Thomson Derwent
File 162:Global Health 1983-2005/Jul
(c) 2005 CAB International
File 164:Allied & Complementary Medicine 1984-2005/Aug
(c) 2005 BLHCIS
File 357:Derwent Biotech Res. _1982-2005/Aug W1
(c) 2005 Thomson Derwent & ISI
File 315:ChemEng & Biotec Abs 1970-2005/Jul
(c) 2005 DECHEMA
File 23:CSA Technology Research Database 1963-2005/Jul
(c) 2005 CSA.

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August 3rd 2005

16/3,K/1 (Item 1 from file: 347)
 DIALOG(R) File 347:JAPIO
 (c) 2005 JPO & JAPIO. All rts. reserv.

07119110 **Image available**

DIRECT COOLING TYPE GRADIENT COIL

PUB. NO.: 2001-346778 [JP 2001346778 A]

PUBLISHED: December 18, 2001 (20011218)

INVENTOR(s): KAINDL ARTHUR

SCHOEN LOTHAR

SCHUSTER JOHANN

APPLICANT(s): SIEMENS AG

APPL. NO.: 2001-112215 [JP 2001112215]

FILED: April 11, 2001 (20010411)

PRIORITY: 00 10018165 [DE 10018165], DE (Germany), April 12, 2000
 (20000412)

DIRECT COOLING TYPE GRADIENT COIL

ABSTRACT

PROBLEM TO BE SOLVED: To improve a **gradient coil** for an MR facility directly **cooled** by a **cooling** pipe embedded in the coil and having a **coolant** circulated by avoiding a large **cooling** pipe length, effectively actuating in a simple structure, and thus achieving a high output design of the **gradient coil**.

SOLUTION: **Cooling** pipes 2, 2', and 2" extended in parallel to each other, and favorably, in parallel to an axial line of this **gradient coil** are combined in the form of a heat exchanger module 1, and **cooling** pipes 2, 2', and 2" in the module 1 are connected to each other in such a way that the maximum length of distance between a **coolant** inlet 3 and a **coolant** exit 4 of the module 1 is twice the coil height.

COPYRIGHT: (C)2001,JPO

16/3,K/2 (Item 1 from file: 350)

DIALOG(R) File 350:Derwent WPIX

(c) 2005 Thomson Derwent. All rts. reserv.

014127860 **Image available**

WPI Acc No: 2001-612070/200171

XRPX Acc No: N01-456862

Gradient coil with direct cooling for magnetic resonance equipment - with heat exchanger modules arranged parallel to axis of gradient coil and parallel to each other

Patent Assignee: SIEMENS AG (SIEI); KAINDL A (KAIN-I); SCHOEN L (SCHO-I); SCHUSTER J (SCHU-I)

Inventor: KAINDL A; SCHOEN L; SCHUSTER J

Number of Countries: 004 Number of Patents: 007

Patent Family:

| Patent No | Kind | Date | Applicat No | Kind | Date | Week |
|----------------|------|----------|---------------|------|----------|----------|
| DE 10018165 | A1 | 20011025 | DE 10018165 | A | 20000412 | 200171 B |
| US 20010042385 | A1 | 20011122 | US 2001833909 | A | 20010412 | 200176 |
| JP 2001346778 | A | 20011218 | JP 2001112215 | A | 20010411 | 200206 |
| GB 2364572 | A | 20020130 | GB 20019006 | A | 20010410 | 200216 |
| US 6552545 | B2 | 20030422 | US 2001833909 | A | 20010412 | 200330 |
| DE 10018165 | C2 | 20030807 | DE 10018165 | A | 20000412 | 200352 |

Applied as
 int in the
 action

Reprints
 Entries
 See
 Reference

10/604748

Abstract 32 2005

GB 2364572 B 20041215 GB 20019006 A 20010410 200482

Priority Applications (No Type Date): DE 10018165 A 20000412

Patent Details:

| Patent No | Kind | Lan | Pg | Main IPC | Filing Notes |
|----------------|------|-----|----|--------------|--------------|
| DE 10018165 | A1 | | 4 | G01R-033/385 | |
| US 20010042385 | A1 | | | F25D-017/02 | |
| JP 2001346778 | A | | 4 | A61B-005/055 | |
| GB 2364572 | A | | | G01R-033/385 | |
| US 6552545 | B2 | | | G01V-003/00 | |
| DE 10018165 | C2 | | | G01R-033/385 | |
| GB 2364572 | B | | | G01R-033/385 | |

Gradient coil with direct cooling for magnetic resonance equipment...

...with heat exchanger modules arranged parallel to axis of gradient coil and parallel to each other

...Abstract (Basic): Cooling pipelines (2) are arranged parallel to each other and parallel to axis of gradient coil .

...

...Pipeline is arranged as heat exchanger modules (1) with single cooling pipes coupled with each other so that the maximum length between the inlet (3) and...

...USE - Avoids long cooling pipelines...

...ADVANTAGE - Length of cooling pipes is at most twice of coil height so little pressure loss, which allows low

...Title Terms: DIRECT ;

16/3,K/3 (Item 2 from file: 350)

DIALOG(R)File 350:Derwent WPIX

(c) 2005 Thomson Derwent. All rts. reserv.

N/A TAF 8/3/2005

004679644

WPI Acc No: 1986-182986/198628

XRPX Acc No: N86-136560

Solenoid magnet with Bitter coils of unequal length - has spacings chosen for max. homogeneity of axial magnetic field

Patent Assignee: AUBERT G (AUBE-I); THOMSON-CGR (CSFC)

Inventor: AUBERT G

Number of Countries: 012 Number of Patents: 004

Patent Family:

| Patent No | Kind | Date | Applicat No | Kind | Date | Week |
|------------|------|----------|-------------|------|----------|----------|
| WO 8603882 | A | 19860703 | WO 85FR341 | A | 19851129 | 198628 B |
| FR 2574980 | A | 19860620 | | | | 198631 |
| EP 204742 | A | 19861217 | EP 85905843 | A | 19851129 | 198651 |
| US 4748429 | A | 19880531 | US 86905316 | A | 19860813 | 198824 |

Priority Applications (No Type Date): FR 8419191 A 19841214

Patent Details:

| Patent No | Kind | Lan | Pg | Main IPC | Filing Notes |
|------------|------|-----|----|----------|--------------|
| WO 8603882 | A | F | 18 | | |

Designated States (National): JP US

Designated States (Regional): AT BE CH DE FR GB IT LU NL SE

EP 204742 A F

Designated States (Regional): DE GB NL

...Abstract (Basic): Three pairs of coils (13-15) are sepd. by tubular spacers (20) contg. **coolant** liq. (25), and are connected electrically in series to a **direct** -current supply (29). The coils have common internal and external dia. but their lengths are...

...axis of the central bore (11). The assembly is surrounded by a conventional system of **gradient coils** (30), and an internal array of RF antennas (31) is excited from a generator (33...

...USE/ADVANTAGE - For NMR imaging. Reduced conductor mass and electrical power consumption. **Coolant** circulation simplified. (18pp Dwg.No.3/3)

?

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August 31-2005

X

13/3,K/16 (Item 10 from file: 350) Links

Derwent WPIX

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Applied As per Add in the
8/6/2005 Office Action
Ex. 1A-F

011036465 **Image available**

WPI Acc No: 1997-014389/199702

XRPX Acc No: N97-012494

**Superconductive magnet for magnetic
resonance imaging system - has one or more
gradient coils of superconductive material
operative to produce field gradients during operation of the magnet**

Patent Assignee: CRYOGENIC LTD (CRYO-N); HEWLETT-PACKARD CO (HEWP)

Inventor: GOOD J A; LARSON J D

Number of Countries: 002 Number of Patents: 002

Patent Family:

| Patent No | Kind | Date | Applicat No | Kind | Date | Week |
|------------|------|----------|-------------|------|----------|----------|
| GB 2301674 | A | 19961211 | GB 9511086 | A | 19950601 | 199702 B |
| US 5661445 | A | 19970826 | US 96655552 | A | 19960530 | 199740 |

Priority Applications (No Type Date): GB 9511086 A 19950601

Patent Details:

| Patent No | Kind | Lan | Pg | Main IPC | Filing Notes |
|------------|------|-----|----|--------------|--------------|
| GB 2301674 | A | 14 | | G01R-033/385 | |
| US 5661445 | A | 5 | | H01F-001/00 | |

**Superconductive magnet for magnetic
resonance imaging system...**

**...has one or more gradient coils of
superconductive material operative to produce field gradients during
operation of the magnet**

**...Abstract (Basic): The assembly comprises gradient
coils (24 or 24') enclosed in the vacuum vessel (18) and a
radiation shield surrounding the main field coils (22). The
gradient coils and the main field coils share
a common former (20). The gradient coils may
comprise filaments or filament bundles, and the filaments may be
produced from conventional metal...**

**...sapphire, alumina, ceramics or diamond. The filaments are provided in a
tubular conduit carrying a cooling fluid. The
magnet is cooled by helium or by a cryo-
cooler.**

**...Abstract (Equivalent): primary coil of superconductive material, a
magnet former supporting the primary coil, one or more
gradient coils of superconductive material**

operative to produce field gradients during operation of the magnet,
the one or more **gradient coils** being
supported by the magnet former, and a heat insulating housing within
which the primary coil and the one or more **gradient**
coils are housed...

...Title Terms: **MRI**

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August 3rd 2005

13/3,K/1 (Item 1 from file: 35)
DIALOG(R) File 35:Dissertation Abs Online
(c) 2005 ProQuest Info&Learning. All rts. reserv.

01656932 ORDER NO: AADNQ-28481

**HIGH RESOLUTION MR SYSTEM FOR DYNAMIC ARTERIAL IMAGING IN VITRO (MAGNETIC
RESONANCE IMAGING , VASCULAR ELASTICITY)**

Author: CHU, KENNETH C.
Degree: PH.D.
Year: 1997
Corporate Source/Institution: THE UNIVERSITY OF WESTERN ONTARIO (CANADA)
(0784)
Source: VOLUME 59/07-B OF DISSERTATION ABSTRACTS INTERNATIONAL.
PAGE 3293. 192 PAGES
ISBN: 0-612-28481-6

**HIGH RESOLUTION MR SYSTEM FOR DYNAMIC ARTERIAL IMAGING IN VITRO (MAGNETIC
RESONANCE IMAGING , VASCULAR ELASTICITY)**

The goal of this research is to develop a **magnetic resonance (MR) imaging** system for dynamic imaging of arteries and phantoms in vitro. The system is used to...

...values. Important parameters in minimizing coil temperature were small radius, large copper mass, and forced **cooling** . The **gradient coil** set permitted collection of 33 cardiac gated images in 64 seconds with no temperature change...

...x 2.5 mm thick) was increased by averaging 8 sets of data.

A hydrogenless **fluid** (1,1,2-trichloro-1,2,2-trifluoroethane) was found to be ideal as a pumping **fluid** since it does not introduce flow artifacts in **MR imaging** . The **fluid** was demonstrated to be compatible with arterial tissue for periods under 7 hours as assessed...

1/1A
TAF 8/3/2005

13/3,K/2 (Item 1 from file: 144)
DIALOG(R) File 144:Pascal
(c) 2005 INIST/CNRS. All rts. reserv.

10836323 PASCAL No.: 93-0345682

**Module a bobinages de gradients plats tridimensionnels et a antenne
refroidie pour l'IRM a haute resolution spatiale**

(Specific module with flat tridimensional gradient coils and cooled
radiofrequency coil for high spatial resolution MRI)

COEUR-JOLY Odile; SAINT-JALMES Herve, dir
Universite de Paris 11, Francee

Univ.: Universite de Paris 11. FRA Degree: Th. doct. : Electron.
1992-12; 1992 252 p.

Language: French Summary Language: French; English

(Specific module with flat tridimensional gradient coils and cooled
radiofrequency coil for high spatial resolution MRI)

... reception radiofrequence, egalement integrees dans le module, sont refroidies a la temperature de l'azote **liquide** pour diminuer leur bruit. Deux types d'antennes sont decrites: des antennes en cuivre et...

N/A JAF 8/3/2005

13/3,K/3 (Item 1 from file: 350)
DIALOG(R) File 350:Derwent WPIX

10/604,748

August 3rd 2005

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016870217 **Image available**

WPI Acc No: 2005-194522/200520

XRPX Acc No: N05-160750

Transverse gradient coil for open architecture magnetic resonance imaging system, has strip of electrically conductive material with hollow portion such that fluid is permitted to flow through conductive material

Patent Assignee: GE MEDICAL SYSTEMS GLOBAL TECHNOLOGY CO (GENE); CLARKE N (CLAR-I); DUBY T (DUBY-I); LIU Q (LIUQ-I); MANTONE A (MANT-I); SELLERS M B (SELL-I)

Inventor: CLARKE N; DUBY T; LIU Q; MANTONE A; SELLERS M B

Number of Countries: 003 Number of Patents: 003

Patent Family:

| Patent No | Kind | Date | Applicat No | Kind | Date | Week |
|----------------|------|----------|---------------|------|----------|----------|
| US 20050035764 | A1 | 20050217 | US 2003604748 | A | 20030814 | 200520 B |
| JP 2005058770 | A | 20050310 | JP 2004235800 | A | 20040813 | 200520 |
| GB 2406173 | A | 20050323 | GB 200418128 | A | 20040813 | 200521 |

Priority Applications (No Type Date): US 2003604748 A 20030814

Patent Details:

| Patent No | Kind | Lan | Pg | Main IPC | Filing Notes |
|----------------|------|-----|----|--------------|--------------|
| US 20050035764 | A1 | | 9 | G01V-003/00 | |
| JP 2005058770 | A | | 9 | A61B-005/055 | |
| GB 2406173 | A | | | G01R-033/385 | |

*Applicant's own instnt
Applicant's own instnt
Ex. TAF 8/3/2005*

Transverse gradient coil for open architecture magnetic resonance imaging system, has strip of electrically conductive material with hollow portion such that fluid is permitted to flow through conductive material

Abstract (Basic):

... coil (200) has a strip of electrically conductive material having a hollow portion such that fluid is permitted to flow through the conductive material.

... 1) magnetic resonance imaging apparatus...

...3) method for cooling gradient coil assembly...

...For use in architecture magnetic resonance imaging (MRI) system

...The thermal efficiency of the magnetic resonance imaging (MRI) is increased and the imaging quality is improved by reducing homogeneity variations due to temperature...

...Title Terms: FLUID ;

...International Patent Class (Main): G01R-033/385 ...

... G01V-003/00

International Patent Class (Additional): G01R-033/389

...Manual Codes (EPI/S-X): S01-E02A8A ...

... S03-E07A

13/3,K/4 (Item 2 from file: 350)

DIALOG(R)File 350:Derwent WPIX

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10/604,748

August 3rd 2005

016396969 **Image available**

WPI Acc No: 2004-554878/200454

XRPX Acc No: N04-438930

Hose connection for liquid flow distributor to feed liquid to cooling circuits of especially gradient coils of MRI -scanner has hose fitted into sleeve and by outer surface sealed against inner surface of sleeve

Patent Assignee: SIEMENS AG (SIEI)

Inventor: SCHUSTER J; STOCKER S

Number of Countries: 001 Number of Patents: 001

Patent Family:

| Patent No | Kind | Date | Applicat No | Kind | Date | Week |
|-------------|------|----------|-------------|------|----------|----------|
| DE 10332085 | A1 | 20040805 | DE 10332085 | A | 20030715 | 200454 B |

Priority Applications (No Type Date): DE 10332085 A 20030715

Patent Details:

| Patent No | Kind | Lan | Pg | Main IPC | Filing Notes |
|-------------|------|-----|----|-------------|--------------|
| DE 10332085 | A1 | | 5 | F16L-033/22 | |

Hose connection for liquid flow distributor to feed liquid to cooling circuits of especially gradient coils of MRI -scanner has hose fitted into sleeve and by outer surface sealed against inner surface of...

Abstract (Basic):

... The hose connection for a liquid flow distributor (1) to feed or distribute a liquid to cooling circuits of especially gradient coils has a hose (4) fitted into sleeve (3') and by its outer surface (8) sealed...

... The hose connection is for a liquid flow distributor to feed or distribute a liquid to cooling circuits of especially gradient coils of MRI -scanners...

...The drawing shows a longitudinal section through a fluid flow distributor with cooling hoses fitted in sleeves and sealed by an O-ring...

... liquid flow distributor (1

...Title Terms: LIQUID ;

13/3,K/5 (Item 3 from file: 350)

DIALOG(R) File 350:Derwent WPIX

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015804528 **Image available**

WPI Acc No: 2003-866732/200381

XRPX Acc No: N03-691776

Distributor for feeding coolant to MRI gradient coils is made up of two sections with central fluid channels and branch connections, sections being connected by bolt with blind bore and apertures in its walls

Patent Assignee: SIEMENS AG (SIEI)

Inventor: STOCKER S

Number of Countries: 001 Number of Patents: 002

Patent Family:

| Patent No | Kind | Date | Applicat No | Kind | Date | Week |
|-------------|------|----------|-------------|------|----------|----------|
| DE 10214918 | A1 | 20031113 | DE 1014918 | A | 20020404 | 200381 B |
| DE 10214918 | B4 | 20040226 | DE 1014918 | A | 20020404 | 200415 |

Publications do not have a Valid Prior Art date
The Date of these References are no good Ex. TAF 8/3/2005

Only Publication date
is Applicable and
The Publication date
is No good

Not Prior Art
Ex. TAF 8/3/2005

10/604,748

August 3rd 2005

Priority Applications (No Type Date): DE 1014918 A 20020404

Patent Details:

| Patent No | Kind | Lan | Pg | Main IPC | Filing Notes |
|-------------|------|-----|----|-------------|--------------|
| DE 10214918 | A1 | | 6 | F16K-011/10 | |
| DE 10214918 | B4 | | | F16K-011/10 | |

Distributor for feeding coolant to MRI gradient coils is made up of two sections with central fluid channels and branch connections, sections being connected by bolt with blind bore and apertures in...

Abstract (Basic):

... The three-dimensional distributor for feeding coolant to MRI gradient coils is made up of two sections (2a, 2b) with central fluid channels (6) and branch connections (8) to cooling circuits. The two sections are connected by...

... Feeding coolant to MRI gradient coils .

... Fluid channels (6

...Title Terms: MRI ;

* 13/3,K/6 (Item 4 from file: 350)
 DIALOG(R)File 350:Derwent WPIX
 (c) 2005 Thomson Derwent. All rts. reserv.

013035279 **Image available**
 WPI Acc No: 2000-207130/200019
 XRPX Acc No: N00-154211

Directly cooled magnetic coil especially gradient coil for magnetic resonance equipment - as moulded segments of inter-twisted individual flexible leads of stranded conductor placed around cooling tube

Patent Assignee: SIEMENS AG (SIEI)

Inventor: ARZ W; STOCKER S

Number of Countries: 003 Number of Patents: 005

Patent Family:

| Patent No | Kind | Date | Applicat No | Kind | Date | Week |
|---------------|------|----------|--------------|------|----------|--------|
| DE 1920839987 | A1 | 20000309 | DE 198039987 | A | 19980902 | 200019 |
| GB 2342986 | A | 20000426 | GB 9920411 | A | 19990827 | 200023 |
| DE 1920839987 | C2 | 20000706 | DE 198039987 | A | 19980902 | 200035 |
| GB 2342986 | B | 20020130 | GB 9920411 | A | 19990827 | 200216 |
| US 6741152 | B1 | 20040525 | US 99388582 | A | 19990902 | 200435 |

Priority Applications (No Type Date): DE 198039987 A 19980902

Patent Details:

| Patent No | Kind | Lan | Pg | Main IPC | Filing Notes |
|---------------|------|-----|----|--------------|--------------|
| DE 1920839987 | A1 | | 8 | G01R-033/385 | |
| GB 2342986 | A | | | G01R-027/16 | |
| DE 1920839987 | C2 | | | G01R-033/385 | |
| GB 2342986 | B | | | G01R-027/16 | |
| US 6741152 | B1 | | | H01F-005/00 | |

Directly cooled magnetic coil especially gradient coil for magnetic resonance equipment...

...Abstract (Basic): for the windings, which are provided with an inner cooling channel to convey a cooling liquid e.g. water. The conductors are designed as moulded segmented conductors (1,1'), whose discrete...

...International Patent Class (Main): G01R-033/385

International Patent Class (Additional): G01R-033/38 ...

*AA Already made
 Record by The Examiner
 from US Pat Updated Search
 Ex. TAF 8/3/2005*

*Has a plastic coating
 gradient
 Between windings*

N/A TAF 8/3/2005

10/604,748

August 31 2005

... G01R-033/385

Manual Codes (EPI/S-X): S01-E02A2 ...

... S01-E02A8A ...

... S03-E07A ...

... S05-D02B1

13/3,K/7 (Item 5 from file: 350)

DIALOG(R) File 350:Derwent WPIX

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004098792

WPI Acc No: 1984-244333/198440

XRPX Acc No: N84-182736

Generation of pictures and spectra of object using NMR - using cryostat
with vacuum jacket in which gradient coils are spatially insulated

Patent Assignee: SIEMENS AG (SIEI)

Inventor: OPPELT A

Number of Countries: 005 Number of Patents: 005

Patent Family:

| Patent No | Kind | Date | Applicat No | Kind | Date | Week |
|------------|------|----------|-------------|------|----------|----------|
| DE 3310160 | A | 19840927 | DE 3310160 | A | 19830321 | 198440 B |
| EP 123075 | A | 19841031 | EP 84102395 | A | 19840306 | 198444 |
| EP 123075 | B | 19870204 | | | | 198705 |
| DE 3462359 | G | 19870312 | | | | 198711 |
| US 4652824 | A | 19870324 | US 84586049 | A | 19840305 | 198714 |

Priority Applications (No Type Date): DE 3310160 A 19830321

Patent Details:

| Patent No | Kind | Lan | Pg | Main IPC | Filing Notes |
|------------|------|-----|----|----------|--------------|
| DE 3310160 | A | | 17 | | |
| EP 123075 | A | G | | | |

Designated States (Regional): DE FR GB NL

EP 123075 B G

Designated States (Regional): DE FR GB NL

Generation of pictures and spectra of object using NMR -

...Abstract (Basic): for producing images and spatially resolved spectra of an object under examination by means of **nuclear magnetic resonance**, wherein there are arranged magnetic coils for applying fundamental and gradient fields to the object...

...arranged in the vacuum jacket with the gradient coils which are spatially insulated. Pref. the **gradient coils** are **cooled** by the vaporising helium which serves to cool the super-conducting base field coils. Alternatively, the **gradient coils** may be **cooled** by vaporising **liquid** nitrogen which cools radiation shields in the cryostat...

...Abstract (Equivalent): for producing images and spatially resolved spectra of an object under examination by means of **nuclear magnetic resonance**, wherein there are arranged magnetic coils for applying fundamental and gradient fields to the object...

...Title Terms: NMR ;

...International Patent Class (Additional): G01N-024/08 ...

G01R-033/20

N/A

Ex. TAF
8/3/2005

10/604,748

Aug 31 2005

21/3,K/1 (Item 1 from file: 2)
DIALOG(R)File 2:INSPEC
(c) 2005 Institution of Electrical Engineers. All rts. reserv.

8269207 INSPEC Abstract Number: A2005-06-8760I-064, B2005-03-7510N-118
Title: Momentum-weighted conjugate gradient descent algorithm for gradient coil optimization
Author(s): Hanbing Lu; Jesmanowicz, A.; Shi-Jiang Li; Hyde, J.S.
Author Affiliation: Dept. of Biophys., Med. Coll. of Wisconsin, Milwaukee, WI, USA
Journal: Magnetic Resonance in Medicine vol.51, no.1 p.158-64
Publisher: Wiley,
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Language: English
Subfile: A B
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Date No good
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Ex. TAF 8/3/2005

Title: Momentum-weighted conjugate gradient descent algorithm for gradient coil optimization
Abstract: MRI **gradient coil** design is a type of nonlinear constrained optimization. A practical problem in transverse **gradient coil** design using the conjugate gradient descent (CGD) method is that wire elements move at different...

...intrinsic property of the Levenberg-Marquardt algorithm, to adjust step sizes along the three orthogonal **directions**. A water-cooled, 12.8 cm inner diameter, three axis torque-balanced **gradient coil** for rat imaging was developed based on this method, with an efficiency of 2.13...

...field uniformity by 27%. This method has also been applied to the design of a **gradient coil** for the human brain, employing remote current return paths. The benefits of this design include improved gradient field uniformity and efficiency, with a shorter length than **gradient coil** designs using coaxial return paths.

...Identifiers: **gradient coil** optimization...

...MRI **gradient coil** design...

...three axis torque-balanced **gradient coil** ;

21/3,K/2 (Item 1 from file: 155)
DIALOG(R)File 155:MEDLINE(R)
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15138767 PMID: 14705056
Momentum-weighted conjugate gradient descent algorithm for gradient coil optimization.
Lu Hanbing; Jesmanowicz Andrzej; Li Shi-Jiang; Hyde James S
Department of Biophysics, Medical College of Wisconsin, Milwaukee, Wisconsin 53226, USA.
Magnetic resonance in medicine - official journal of the Society of Magnetic Resonance in Medicine / Society of Magnetic Resonance in Medicine (United States) Jan 2004, 51 (1) p158-64, ISSN 0740-3194
Journal Code: 8505245

Date No good Not Pat Aft Ex. TAF 8/3/2005

10/604,748

August 31 2005

Contract/Grant No.: EB000215; EB; NIBIB; EB002014; EB; NIBIB
Publishing Model Print
Document type: Journal Article
Languages: ENGLISH
Main Citation Owner: NLM
Record type: MEDLINE; Completed

N/A TAF 8-5-2005
Date is 10/604

Momentum-weighted conjugate gradient descent algorithm for gradient coil optimization.

MRI **gradient** coil design is a type of nonlinear constrained optimization. A practical problem in transverse **gradient** coil design using the conjugate gradient descent (CGD) method is that wire elements move at different...

...intrinsic property of the Levenberg-Marquardt algorithm, to adjust step sizes along the three orthogonal **directions**. A water-cooled, 12.8 cm inner diameter, three axis torque-balanced **gradient** coil for rat imaging was developed based on this method, with an efficiency of 2.13...

...field uniformity by 27%. This method has also been applied to the design of a **gradient** coil for the human brain, employing remote current return paths. The benefits of this design include improved gradient field uniformity and efficiency, with a shorter length than **gradient** coil designs using coaxial return paths. Copyright 2003 Wiley-Liss, Inc.

21/3,K/3 (Item 1 from file: 94)

DIALOG(R)File 94:JICST-EPlus

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04163700 JICST ACCESSION NUMBER: 99A0415255 FILE SEGMENT: JICST-E

Development and Future Aspects of Middle Field MRI System.

GORO TAKEHIKO (1); SUGIMOTO HIROSHI (1); MACHIDA YOSHIO (1)

(1) Toshiba Corp.

Nichidoku Iho(Japanisch-Deutsche Medizinische Berichte), 1998,

VOL.43,zokango, PAGE.164-172, FIG.9, REF.15

JOURNAL NUMBER: S0730BAH ISSN NO: 0912-0351

UNIVERSAL DECIMAL CLASSIFICATION: 616-071

LANGUAGE: Japanese COUNTRY OF PUBLICATION: Japan

DOCUMENT TYPE: Journal

ARTICLE TYPE: Commentary

MEDIA TYPE: Printed Publication

...ABSTRACT: developed and introduced a new middle field system, MRT-50A/SUPER, with an actively shielded **gradient** coil and MR angiography capability in 1992. Then, another new 0.5-T system, FLEXART, was...

...type superconducting magnet with superior access to the patient area and a new refrigerator which **cools** the superconducting wire **directly** without liquid helium. (author abst.)

21/3,K/4 (Item 1 from file: 347)

DIALOG(R)File 347:JAPIO

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08310510 **Image available**

METHOD AND APPARATUS FOR **DIRECTLY** COOLING HOLLOW CONDUCTOR WOUND AROUND TRANSVERSE **GRADIENT** COIL BOARDS

8-3-2005
N/A TAF
direct Cooling
Main Magnetic Coils
Not Gradient Coils

10/604748

August 3rd 2005

PUB. NO.: 2005-058770 [JP 2005058770 A]
PUBLISHED: March 10, 2005 (20050310)
INVENTOR(s): MANTONE ANTHONY
CLARKE NEIL
DUBY TOMAS
LIU QIN
SELLERS MICHAEL B
APPLICANT(s): GE MEDICAL SYSTEMS GLOBAL TECHNOLOGY CO LLC
APPL. NO.: 2004-235800 [JP 2004235800]
FILED: August 13, 2004 (20040813)
PRIORITY: 03 604748 [US 2003604748], US (United States of America),
August 14, 2003 (20030814)

Applicant's Own Invention
Application Not Prior Art

Ex. TAF 8-3-2005

METHOD AND APPARATUS FOR **DIRECTLY** COOLING HOLLOW CONDUCTOR WOUND AROUND
TRANSVERSE **GRADIENT** COIL BOARDS

ABSTRACT

PROBLEM TO BE SOLVED: To provide an assembly which dissipates heat generated by a transverse **gradient** coil board used for MRI.

SOLUTION: MRI operates by passing current through **gradient** coils (212, 214) to create a magnetic field. Creation of the magnetic field requires a relatively...

...the patient space. The present invention provides for a hollow conductor (212) through which a **coolant** can be passed **directly** during the application of current.

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21/3,K/5 (Item 1 from file: 350)

DIALOG(R) File 350:Derwent WPIX
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017071198 **Image available**
WPI Acc No: 2005-395539/200540
XRPX Acc No: N05-320612

Gradient coil system for magnetic resonance imaging system, has **primary coil element made from hollow conductor, that is arranged between X and Y primary coil elements that have mutually different linearity volumes respectively**

Patent Assignee: KONINK PHILIPS ELECTRONICS NV (PHIG)

Inventor: HAM C L G

Number of Countries: 108 Number of Patents: 001

Patent Family:

| Patent No | Kind | Date | Applicat No | Kind | Date | Week |
|--------------|------|----------|----------------|------|----------|----------|
| WO 200543185 | A1 | 20050512 | WO 20041B52121 | A | 20041018 | 200540 B |

Priority Applications (No Type Date): EP 2003103998 A 20031029

Patent Details:

Patent No Kind Lan Pg Main IPC Filing Notes

WO 200543185 A1 E 20 G01R-033/385

Designated States (National): AE AG AL AM AT AU AZ BA BB BG BR BW BY BZ
CA CH CN CO CR CU CZ DE DK DM DZ EC EE EG ES FI GB GD GE GH GM HR HU ID
IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ
NA NI NO NZ OM PG PH PL PT RO RU SC SD SE SG SK SL SY TJ TM TN TR TT TZ
UA UG US UZ VC VN YU ZA ZM ZW

Designated States (Regional): AT BE BG BW CH CY CZ DE DK EA EE ES FI FR

Date No good
Not Available as Prior Art
Ex. TAF 8/3/2005

10/604,748

August 31 2005

GB GH GM GR HU IE IT KE LS LU MC MW MZ NA NL OA PL PT RO SD SE SI SK SL
SZ TR TZ UG ZM ZW

Gradient coil system for magnetic resonance imaging system, has Z
primary coil element made from hollow conductor...

Abstract (Basic):

... The X and Y primary coil elements are cooled directly by the
cooling fluid flowing through the Z primary coil element...

...The figure shows a cross-sectional view of the gradient coil system

21/3,K/6 (Item 2 from file: 350)

DIALOG(R)File 350:Derwent WPIX

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008859073 **Image available**

WPI Acc No: 1991-363096/199150

XRPX Acc No: N91-278137

Superconducting magnet apparatus with circulating path for coolant - has
coil with shaped annulus surrounding photographic field contained in
coolant vessel of double structure filled with liquid helium

Patent Assignee: TOSHIBA KK (TOKE)

Inventor: SATO A

Number of Countries: 005 Number of Patents: 006

Patent Family:

| Patent No | Kind | Date | Applicat No | Kind | Date | Week |
|-------------|------|----------|-------------|------|----------|----------|
| EP 460601 | A | 19911211 | EP 91109106 | A | 19910604 | 199150 B |
| JP 4042977 | A | 19920213 | JP 90147473 | A | 19900607 | 199213 |
| EP 460601 | A3 | 19920617 | EP 91109106 | A | 19910604 | 199333 |
| US 5304972 | A | 19940419 | US 91711203 | A | 19910606 | 199415 |
| EP 460601 | B1 | 19950726 | EP 91109106 | A | 19910604 | 199534 |
| DE 69111518 | E | 19950831 | DE 611518 | A | 19910604 | 199540 |
| | | | EP 91109106 | A | 19910604 | |

Priority Applications (No Type Date): JP 90147473 A 19900607

Patent Details:

Patent No Kind Lan Pg Main IPC Filing Notes

EP 460601 A

Designated States (Regional): DE FR GB

JP 4042977 A 4

US 5304972 A 7 H01L-039/00

EP 460601 B1 E 9 H01F-006/06

Designated States (Regional): DE FR GB

DE 69111518 E H01F-006/06 Based on patent EP 460601

...Abstract (Equivalent): which is substantially perpendicular to the line
of gravity, i.e., extending in the horizontal **direction**. The coil is
contained in a **coolant** vessel of a double structure filled with a
coolant (e.g. liquid helium). Specifically, it...

...tip portion of superconducting coil is reduced to minimum necessary
value without losing symmetry to **gradient coil** of cryostat of MRI,
enhancing economy and safety during operation...

?

N/A TAF

8/3/2005

main
Superconducts Magnet is Cooled
Not gradient Coil

10/ 604, 748

August 31 2005

Not Prior Art
Date No good
Ex. TAF 8-3-2005

13/3,K/7 (Item 1 from file: 350) Links

Derwent WPIX

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017071198 **Image available**

WPI Acc No: 2005-395539/200540

XRPX Acc No: N05-320612

Gradient coil system for

magnetic resonance imaging system,

**has Z primary coil element made from hollow conductor, that is arranged
between X and Y primary coil elements that have mutually different
linearity volumes respectively**

Patent Assignee: KONINK PHILIPS ELECTRONICS NV (PHIG)

Inventor: HAM C L G

Number of Countries: 108 Number of Patents: 001

Patent Family:

| Patent No | Kind | Date | Applicat No | Kind | Date | Week |
|--------------|------|-----------------|----------------|------|-----------------|----------|
| WO 200543185 | A1 | <u>20050512</u> | WO 20041B52121 | A | <u>20041018</u> | 200540 B |

Priority Applications (No Type Date): EP 2003103998 A 20031029

Patent Details:

Patent No Kind Lan Pg Main IPC Filing Notes

WO 200543185 A1 E 20 G01R-033/385

Designated States (National): AE AG AL AM AT AU AZ BA BB BG BR BW BY BZ
CA CH CN CO CR CU CZ DE DK DM DZ EC EE EG ES FI GB GD GE GH GM HR HU ID
IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ
NA NI NO NZ OM PG PH PL PT RO RU SC SD SE SG SK SL SY TJ TM TN TR TT TZ
UA UG US UZ VC VN YU ZA ZM ZW

Designated States (Regional): AT BE BG BW CH CY CZ DE DK EA EE ES FI FR
GB GH GM GR HU IE IT KE LS LU MC MW MZ NA NL OA PL PT RO SD SE SI SK SL
SZ TR TZ UG ZM ZW

Gradient coil system for

magnetic resonance imaging system,

**has Z primary coil element made from hollow conductor, that is arranged
between X...**

Abstract (Basic):

... An INDEPENDENT CLAIM is also included for **magnetic
resonance imaging system...**

...For **magnetic resonance imaging**
system (claimed...

...The X and Y primary coil elements are **cooled** directly by
the **cooling fluid** flowing through the Z
primary coil element...

...The figure shows a cross-sectional view of the **gradient**

coil system...

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August 24 2005

13/3,K/8 (Item 2 from file: 350) Links

Derwent WPIX

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Applicants
of current Application
TAF
Own Work
8/3/2005
Not Prior Art

016870217 **Image available**

WPI Acc No: 2005-194522/200520

XRPX Acc No: N05-160750

**Transverse gradient coil for open
architecture magnetic resonance
imaging system, has strip of electrically conductive
material with hollow portion such that fluid is permitted to
flow through conductive material**

Patent Assignee: GE MEDICAL SYSTEMS GLOBAL TECHNOLOGY CO (GENE); CLARKE N
(CLAR-I); DUBY T (DUBY-I); LIU Q (LIUQ-I); MANTONE A (MANT-I); SELLERS M
B (SELL-I)

Inventor: CLARKE N; DUBY T; LIU Q; MANTONE A; SELLERS M B

Number of Countries: 003 Number of Patents: 003

Patent Family:

| Patent No | Kind | Date | Applicat No | Kind | Date | Week |
|----------------|------|----------|---------------|------|----------|----------|
| US 20050035764 | A1 | 20050217 | US 2003604748 | A | 20030814 | 200520 B |
| JP 2005058770 | A | 20050310 | JP 2004235800 | A | 20040813 | 200520 |
| GB 2406173 | A | 20050323 | GB 200418128 | A | 20040813 | 200521 |

Priority Applications (No Type Date): US 2003604748 A 20030814

Patent Details:

| Patent No | Kind | Lan | Pg | Main IPC | Filing Notes |
|----------------|------|-----|----|--------------|--------------|
| US 20050035764 | A1 | | 9 | G01V-003/00 | |
| JP 2005058770 | A | | 9 | A61B-005/055 | |
| GB 2406173 | A | | | G01R-033/385 | |

**Transverse gradient coil for open
architecture magnetic resonance
imaging system, has strip of electrically conductive
material with hollow portion such that fluid is permitted to
flow through conductive material**

Abstract (Basic):

... A transverse **gradient coil** (200) has a
strip of electrically conductive material having a hollow portion such
that **fluid** is permitted to flow through the conductive
material.

... 1) **magnetic resonance
imaging apparatus...**

...2) **gradient coil assembly; and...**

...3) method for **cooling gradient
coil assembly...**

...For use in architecture **magnetic resonance**

imaging (MRI) system...

...The thermal efficiency of the **magnetic resonance imaging (MRI)** is increased and the imaging quality is improved by reducing homogeneity variations due to temperature...

...The figure shows a schematic illustration of the **cooling** system...

...**gradient coil** (200...

...**cooling** tubes (232...

...**coolant** pump (240...

...**coolant** lines (261,262

...Title Terms: **FLUID;**

10/604,748

August 31 2005

13/3,K/10 (Item 4 from file: 350) Links

Derwent WPIX

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016634791 **Image available**

WPI Acc No: 2004-793504/200478

XRAM Acc No: C04-276999

XRPX Acc No: N04-625219

Magnetic resonance

imaging system used in medical procedure for obtaining detailed images of patient, comprises patient bore, gradient coil assembly, radio frequency coil assembly, copper stub, and non-conducting manifold

Patent Assignee: GENERAL ELECTRIC CO (GENE)

Inventor: SELLERS M B

Number of Countries: 003 Number of Patents: 003

Patent Family:

| Patent No | Kind | Date | Applicat No | Kind | Date | Week | |
|---------------|------|----------|---------------|------|----------|--------|---|
| US 6812705 | B1 | 20041102 | US 2003707322 | A | 20031205 | 200478 | B |
| GB 2409279 | A | 20050622 | GB 200426388 | A | 20041201 | 200541 | |
| JP 2005199047 | A | 20050728 | JP 2004350874 | A | 20041203 | 200549 | |

Priority Applications (No Type Date): US 2003707322 A 20031205

Patent Details:

| Patent No | Kind | Lan | Pg | Main IPC | Filing Notes |
|---------------|------|-----|----|--------------|--------------|
| US 6812705 | B1 | | 8 | G01V-003/00 | |
| GB 2409279 | A | | | A61B-005/055 | |
| JP 2005199047 | A | | 13 | A61B-005/055 | |

Magnetic resonance

imaging system used in medical procedure for obtaining detailed images of patient, comprises patient bore, gradient coil assembly, radio frequency coil assembly, copper stub, and non-conducting manifold

Abstract (Basic):

... A magnetic resonance

imaging system has patient bore; gradient coil assembly surrounding patient bore; radio frequency coil assembly between patient bore and gradient coil assembly; copper stub fluidically coupled to each hollow conductor structure (43); and non-conducting manifold fluidically coupled to each copper stub pipe and coolant source.

... The magnetic resonance

imaging (MRI) system comprises patient bore; gradient coil assembly surrounding patient bore; radio frequency (RF) coil assembly between patient bore and gradient coil assembly, and comprising hollow

Not Prior Art

Date No good

Ex. TAF 8/3/2005

conductor structure **fluidically** coupled to **coolant** source having non-conductive **coolant** flowing through the conductor structure to maintain the patient bore below a maximum desired temperature during operation of the **MRI** system; copper stub **fluidically** coupled to each hollow conductor structure; and non-conducting manifold **fluidically** coupled to each copper stub pipe and **coolant** source. An INDEPENDENT CLAIM is also included for a method for forming **MRI** machine having temperature-controlled patient bore comprising providing pair of mandrels (71, 73); introducing RF...

...pressure to the cavity; curing the uncured composite material; removing the mandrels to form a **coolant-cooled** body coil assembly; introducing the **coolant-cooled** RF body coil assembly within the **MRI** machine between a **gradient coil** assembly and the patient bore; **fluidically** coupling the **coolant-cooled** RF body coil to the **coolant** source; and introducing a **coolant** from the **coolant** source through the body coil during scanning procedure...

...The invention allows RF body coils to run **cooler** and provide a thermal barrier to heat emitted by the **gradient coil** during **MRI** scan. This makes the patient bore **cooler** during the scans. This in turn allows the scans to be longer without affecting the...

...The figure is a partial section view of the **MRI** system...
Technology Focus:

... RF antennae (25) spaced circumferentially around the patient bore; composite material; hollow conductor structures; and **coolant** source. The **MRI** system further comprises glass cloth introduced within the composite material. Preferred Materials: The composite material is formed from reaction of bisphenol A-type epoxy resin with an anhydride hardener. The **coolant** source comprises water. The non-conductive **coolant** comprises deionized water. The hollow conductor structures comprise hollow copper structure.